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# THE SURGICAL MANAGEMENT OF OBSTRUCTIVE JAUNDICE.

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Preparatory to discussing the surgical management of obstructive jaundice, it is of interest to recall the cycle of events arising in this condition.

With an obstruction between the hepatic duct and the duodenum, the secretion of bile ceases, causing some of the constituents of the stagnated bile to pass over into the circulatory system, which in turn deposits the bile salts throughout the body tissues, producing jaundice[1]. It is to be noted that jaundice may even be detected in the blood serum previous to the stage of visible pigment deposition.

The damming back of the bile into the liver impairs the function of this important organ and at the same time a condition is produced favoring infection. The consequentially damaged functioning of the liver, plus the bile salts circulating in the blood stream throw an extra burden on the kidneys.

It is thought that these circulating bile salts unite with the blood calcium and thus deprive the blood of an essential constituent for coagulation. The result may be a heightened coagulation time.

To assist in elimination, the human economy utilizes its water equilibrium, frequently depleting the body cells of their normal fluid suspension.

The condition presented for consideration is then as follows:

1. Impaired liver function.
2. Decrease in the coagulability of the blood.
3. Excess burden on the kidneys.
4. Dehydration.

Emphasis should also be placed on two important functions of the liver:[2]

1. To furnish in great part the sugar supply of the blood for the brain. The brain cells contain practically no stored carbohydrates or neutral fats.

2. To eliminate the acid by-products of metabolism through the kidneys and lungs by its oxidising and reducing powers.

It is a known fact that in the case of an animal whose liver has been excised, the blood tends to become acid as death approaches. Death invariably takes place within a few hours after the removal of the liver. Mann[3] recently proved that dogs could be kept alive for from twenty to thirty-four hours following hepatectomy by the administration of glucose.

In the analysis of a patient with obstructive jaundice it is of importance to study the degree and duration of jaundice. A heightened coagulation time should be suspected in cases of marked jaundice that has lasted longer than two weeks. This condition is determined by estimating the coagulation time of the blood and also the available calcium in the blood serum. West[4] has pointed out that a total calcium of the serum may be normal with a subnormal ionizable or available calcium. His test gives accurate figures on the coagulation factors, available calcium and thrombin. Walters[5] in a report from the Mayo Clinic, states that of patients coming to necropsy following an operation for obstructive jaundice more than fifty per cent. died from intra-abdominal hemorrhage, while, on the other hand, six per cent. of similar operated cases without obstructive jaundice, died from an intra-abdominal hemorrhage. That hemorrhage frequently follows an operative procedure in patients that have been jaundiced for some time is known. Walters' report emphasises that the outstanding danger during the immediate post-operative period is a slow hemorrhage from areas exposed by dissection. The high mortality rate in the severely jaundiced case is due in part to the post-operative slow hemorrhage and the additional factors of a damaged liver, dehydration and toxicity from the bile salts saturating the tissues.

The above statements show that in jaundiced patients the organism is a greatly damaged one. It is, therefore, of the utmost importance to preserve and protect the impaired vital organs and if possible to increase the margin of safety for cases that require a surgical procedure. The pre-operative period is the time at which precautionary steps may be instituted relative to relieving those critical situations that are apt to present themselves immediately following the operation itself.

*Pre-operative preparation*: If on examination the coagulation time of the blood is found to be increased or the available calcium of the blood diminished, then measures are taken to decrease the length of the co-

agulation time. Daily intravenous injections of 5 cc. of a 10% calcium chloride solution for a three day period will reduce the coagulation time, as pointed out by Walters.

The water balance is established through urging water by mouth and, if necessary, by the subcutaneous administration of saline solutions. Large quantities of carbohydrates should be added to the diet and sugars given in addition, to furnish the liver and muscles with sufficient amounts for storage purposes.

Hot applications over the abdomen form a stimulant to the activity of the liver.

If doubt exists as to the severity of the operative risk, a transfusion of whole blood should be given.

*Operative*: The choice of anesthetic is of the utmost importance. Under no circumstances should chloroform be used. Ether is also contraindicated on account of its lipoid-solvent properties. The anesthetic of choice is light nitrous oxid, plus oxygen narcosis and a local anesthetic of 0.5% novocain solution.

An ample incision should be made, permitting a sharp knife dissection throughout—a dissection under direct view of the eye. Traumatism of the tissues must be avoided and the liver handled with extreme care to prevent any injury to its covering. The obstruction should be relieved by measures that are best suited for the condition as found in each case. To relieve the damming back of the bile into the liver, drainage of the common duct is instituted, which also facilitates the elimination of infection if present. A minimum amount of dissection is done, avoiding unnecessary raw areas, thus eliminating hemorrhage following. The operation should be performed in as short a time as is consistent with good surgery.

*Post-operative*: To control undue pain morphia is administered. The water balance should be maintained by giving each twenty-four hours 4000 cc. of saline solution into the subcutaneous tissues until such time that water is readily taken by mouth. Hot applications are employed constantly over the entire abdomen to stimulate chemical activity of the liver. Glucose solution should be given, if necessary, by subcutaneous and intravenous injections. One or more transfusions of whole blood are given should oozing from raw areas take place.

SUMMARY.

The outstanding causes for a high mortality rate following operation for obstructive jaundice are hemorrhage and impaired liver function.

The pre-operative preparation is directed towards decreasing the coagulation time of the blood, and establishing a reserve of sugars in the liver and muscles and an adequate water balance.

The operative procedure should be done under nitrous oxid plus oxygen and local anesthesia, all dissection made with the sharp knife, and trauma minimized.

In the post-operative period the fluid equilibrium should be maintained and sufficient sugar administered to guard against its depletion. Blood transfusions should be performed if oxygenation lags or if hemorrhage occurs.

REFERENCES.

1. Burton-Opitz, R.: A Text Book of Physiology. W. B. Saunders Company, Philadelphia and London, 1920; pp. 938-948.
2. Crile, G. W.: A Physical Interpretation of Shock, Exhaustion and Restoration. Oxford University Press, London, 1921; pp. 115-116.
3. Mann, F. C., quoted by Waltman Walters: Pre-operative Preparation of Patients with Obstructive Jaundice. *Surgery, Gynecology and Obstetrics*, December, 1921, **33**, 655.
4. West, Fred A.: A New Method for the Determination of Calcium and Thrombin in Serum. *Journal of the A. M. A.*, April 8, 1922, **78**, 1041.
5. Walters, Waltman: Pre-operative Preparation of Patients with Obstructive Jaundice. *Surgery, Gynecology and Obstetrics*, December, 1921, **33**, 651.

## THE TREATMENT OF CARBUNCLE WITH THE ACTUAL CAUTERY.

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The idea of treating carbuncle by this method was suggested to me by the results obtained with the cautery in the treatment of carcinoma, and by the failure to obtain satisfactory results by the ordinary

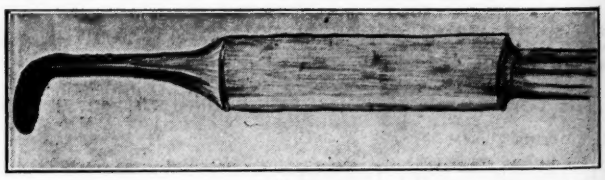

Fig. 1. Percy flat-curved cautery-point, used in the operation.

means of treatment advocated in text-books and surgical literature, as well as those which were entered into from my own experience. While occasional mention of the use of a cautery is made by some authors, I fail to find a clear-cut description of the proper technic. Therefore I wish to present a technic, which, in my own hands, has been very gratifying.

The field is prepared by removing the hair from a suitable area with clippers, but it is not shaved until the phlegmon is removed. In this way we avoid danger of contaminating the surrounding healthy skin. The skin is cleansed with soap and water, alcohol and ether, but is not painted with iodine, as we desire to preserve its natural color in order that

we may more readily recognize the line of demarcation between healthy and diseased tissue. After removing the phlegmon the surrounding skin is shaved, and then cleansed with alcohol and ether, and covered with a coat of tincture of iodine, and then the final dressing is applied.

All towels, sheets and dressings that are to be used in the immediate vicinity of the phlegmon, are wet, thereby preventing a flash of flame, in case they are touched with the cautery during the operation. This

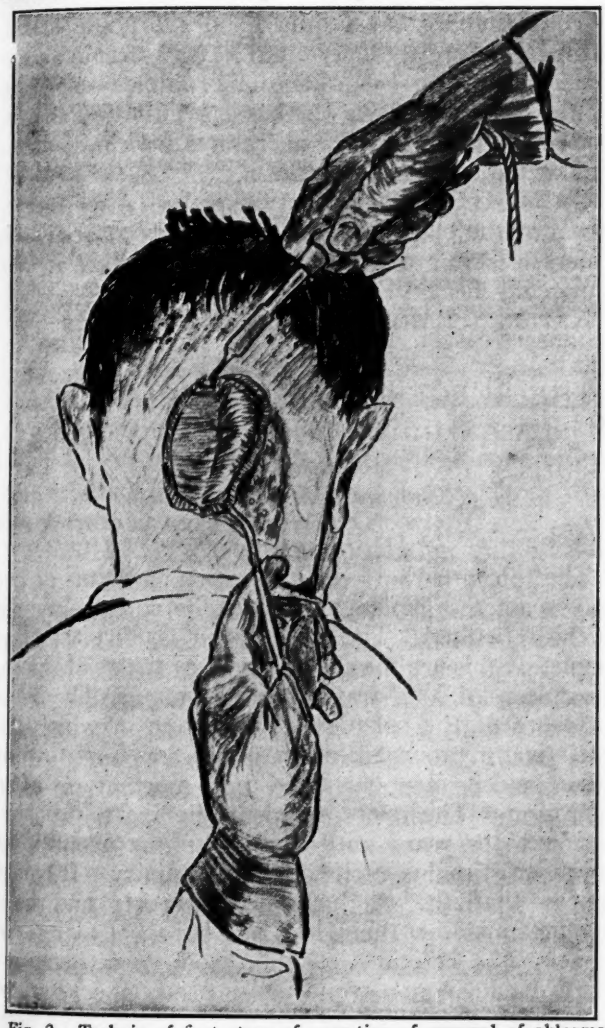

Fig. 2. Technic of first stage of operation of removal of phlegmon with cautery.

is important where ether is being used as the anesthetic, to eliminate the danger of fire. Several layers of moist gauze are placed around the field in close proximity to the line of cauterization.

A Percy cautery handle, mounted with a flat curved point is used (figure 1). The heat required, is that degree which permits the point to travel with ease when introduced into the tissue, and is obtained just short of dull red.

The cautery point is introduced at the line of demarcation between the healthy red and the diseased tissue, which is quite easily recognized by the reddened and indurated condition of the infected tissue. The entire growth is circumscribed with the cautery.

The assistant now grasps the upper edge of the phlegmon with a double-tooth tenaculum and gently rolls the edge back as the operator gradually frees it by a sweeping motion of the cautery (figure 2), not permitting it to remain in one spot longer than a few seconds. The point of the cautery is carried deep enough to remove all the infection, which leaves a crater of charred tissue usually extending down to the fascia.

The point of the cautery is now reversed, and is introduced at the angle of the crater, in such a manner as to undermine its edge to the depth of one centimeter (figure 3). This is insurance against any infection that might become sealed up in the angle if such precaution were not taken. A few layers of gauze moistened in oil are now applied to the crater,

Fig. 3. Point of cautery reversed, showing technic of undermining edge of crater.

and the wound treated with antiseptic dressings for a few days, until the charred tissue can be removed, which is usually at the end of a week. As soon as healthy granulations have formed, the wound is covered with Thiersch skin grafts.

The advantages of the above procedure are:

First—It does not interfere with the ordinary treatment, which can be used in the early stages, the cauterization being applied as soon as there is evidence of spreading.

Second—It is surprising the amount of relief obtained, as patients who were suffering under the influence of opiates are absolutely comfortable as soon as removed from the operating room, and they remain so until the wound is healed.

Third—At one sitting, without shock or danger to the patient, the entire disease is eradicated within a few minutes.

Fourth—We can shorten the course of the disease very materially as this treatment can be applied when

the phlegmon is small, thereby preventing a large crater, which requires a long time to heal.

Fifth—Cauterization seals all capillaries and channels, eliminates the danger of hemorrhage, prevents

Fig. 4. As the crater appeared the second day after the operation.

spreading of the infection by continuity, metatasis, or embolism.

The following case report is typical of all cases that I have treated by this method, except that, be-

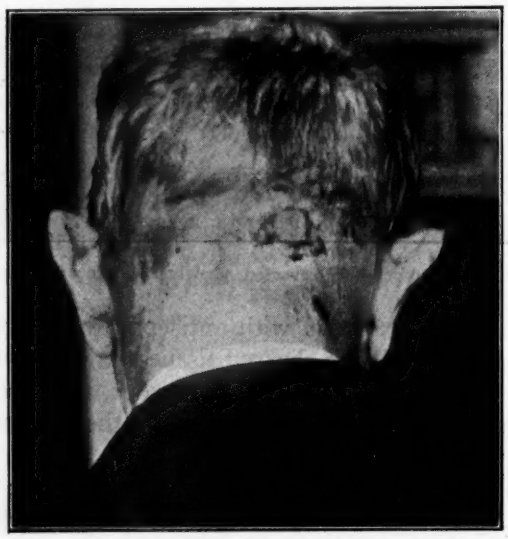

Fig. 5. One week after Thiersch skin-grafts had been applied.

ing the first of the series, was allowed to progress further than the more recent cases:

H. L., age 65 years, a miller, entered my services on February 5, 1922, suffering with a carbuncle the size of a quarter, on the back of his neck. He had been using home remedies for three or four days.

The urine showed a few hyaline casts, no sugar, and no albumin. Red blood cells, 5,100,000; white cells, 15,000; hemoglobin, 95%. Coagulation time, three minutes.

Physical examination, negative, except the carbuncle.

The phlegmon was freely incised and cauterized with iodine and carbolic acid, and a moist dressing of 1-1000 bichloride of mercury applied. That night he suffered considerable pain, and was only slightly relieved by morphine which was administered every few hours. The dressings were changed to Dakin's solution, and my records show that on February 11th, the phlegmon was spreading and decidedly worse, and continued to become rapidly worse, until, on the 13th, at which time it was three inches in diameter; it was removed by actual cautery.

Following the operation, the patient was absolutely comfortable and required no morphine at all, whereas, before the operation, he was decidedly uncomfortable with ½ grain of morphine every three hours. There was no further spreading of the infection and the charred tissue came off with the dressings at the end of the week.

On March 21, 1922, thirty-five days after the removal of the phlegmon, the wound was covered with Thiersch skin-grafts, and one week later, it was completely healed.

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# THE SURGERY OF SPLENIC ANEMIA.

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*(Continued from the June issue)*

## III. PATHOLOGY.

The spleen harbors certain known parasites or unknown microorganisms which excite changes mainly in the reticulum. The early result is fibrosis. Examples of this are the chronic type of malarial spleen, the spleen of kala-azar, syphilis and possibly other members of the splenic anemia group in which the causative microorganism may not be found when these spleens are examined post-mortem or after operation. The microorganisms lie inert, probably dormant for years until they disappear or until an unknown stimulus excites them to activity. It would appear that the production of fibrosis and liver changes may be their last act before leaving the scene. The reactions of this group may be indistinguishable from a group which presupposes a toxin to be the cause. These fibrotic changes have been regarded by Mayo and others as a specific defense phenomenon in the nature of a work hypertrophy.

The pathology described under the older conceptions of splenic anemia, is not uniform in character—that described by Gaucher, Bovaird, Stengel and others is quite different from that described by Banti, later by Harris and Herzog, Dock and Warthin and others. With the type described by Gaucher, Bovaird and Stengel we have nothing exactly comparable. Banti early described a diffuse growth of interstitial connective tissue throughout the pulp, and a change which he considered primary in the Malpighian bodies leading to their sclerosis.

The idiopathic type, necessarily so-called, presents in the gross a spleen much increased in size. The normal shape is usually preserved. The surface is smooth except for patches of perisplenitis. The capsule is thickened and the color variable. On section

the substance is firm, dark brown or red, with scattered white areas which correspond to thickened trabeculae or sclerosed Malpighian bodies.

Microscopically, according to West, the Malpighian bodies may not be altered or they may be diminished in size and badly developed. They may be the seat of atrophy and sclerosis and they may be in various stages of fibrous and hyaline transformation. Banti has observed the presence in Malpighian bodies of irregularly shaped hyaline clumps, and in such cases there are generally in the neighborhood epithelioid cells undergoing hyaline change. According to Banti a conspicuous feature which always distinguishes the reticular from the normal tissue is the thickening that takes place. A fibrous reticulum is substituted for the normal delicate reticulum. The thickening is in proportion to the duration of the disease, and finally areas of splenic pulp may become entirely fibrous. To this Banti has given the name fibro-adenie or fibrosis. Capsule and trabecula may be markedly thickened. It may be the prominent feature as in the case of Nager and Baumlin. Trabeculae may be infiltrated with leucocytes or may contain a meshwork of spaces containing cells which have sprung from their walls. The bloodvessels may show a greatly increased amount of connective tissue. The follicular artery may contain a hyalin thrombus. It is possible to demonstrate that sclerosis in the Malpighian body extends from the sheaths around the follicular artery.

Banti has called particular attention to the disease bearing his name to the endophlebitis of the splenic vein, causing irregular thickening, and even calcareous and atheromatous foci. This condition extends into the portal vein and in the ascitic stage of the disease even the mesenteric veins may be affected. Sir Andrew Clark reported similar findings in the portal vein and it is possible that a later stage may correspond to stenosis of the portal vein, which was observed by Dock and Warthin. The condition of these vessels should receive more attention than is accorded them. There is congestion and hyperplasia of the pulp. Eosinophiles in large number have been found by Nager and Baumlin and in the case reported by them hemorrhages were common. The pulp spaces are usually not dilated. Endothelial proliferation was not a conspicuous feature in cases observed by Banti nor did he observe mitoses in these cells. In the case of Dock and Warthin the spaces were enlarged and in many instances filled with large endothelial cells containing one or more nuclei and in most instances nucleoli. They assert that endothelial cells contribute to the formation of new connective tissue of the reticulum. Endothelial proliferation was so marked in two cases of Harris and Herzog that it was considered the essential splenic lesion. This type probably belongs to the Gaucher group.

In 1910, Banti attempted to show that fibrosis of the Malpighian bodies and reticulum of the spleen, narrowing of the splenic veins, thickening of the splenic capsule and trabeculae, endophlebitis with calcification of the splenic veins, extending up to the portal vein, and cirrhosis of the liver of the Laennic type, constituted a characteristic pathology of the disease bearing his name. There is now, however, definite evidence to destroy this conception and to deny its existence on a pathologic basis. Various types of splenomegalia associated with syphilis, tuberculosis, kala-azar, malaria, et al, give an identical picture with the at times added characteristic changes due to the specific microorganisms in question, such as tubercles, gummata and round-celled perivascular infiltration.

Wilson, of the Mayo Clinic, has summarized the pathologic findings in a group of 15 cases of splenomegalia diagnosed on the blood picture as splenic anemia. The spleen averaged 1130 grams in weight. This is low as compared with the average weight given by Lyons, viz., 1860 grams. The latter's weight-average taken from autopsy cases (late cases) would naturally be higher than in a series of operative cases as the spleen increases in size until death. In the gross there was an even, diffuse enlargement except in those cases in which infarcts occurred. The notch was well preserved. There was little if any change in the configuration of the spleen. The outstanding microscopic features according to Wilson were: 1. Increase in the reticulum, 2. reduction of pulp and lymphoid tissue, 3. fairly constant arteriosclerosis and amyloid degeneration. Wilson states there is no reason to refute the accepted belief that the changes are a low grade chronic inflammatory process with fibrosis.

*Tropical Splenomegaly*: The most obvious changes are found in the spleen, the liver and bone-marrow where parasites are most abundant. The mesenteric glands are often intensely infected, especially when they drain an area of the bowel that has been the seat of ulceration. Less commonly, and in smaller numbers, changes have been found in the pancreas, kidneys, suprarenals, testicles and lungs.

The spleen is usually enormously enlarged, and if examined immediately after death, is of firm consistency and of a deep red color on section. The capsule is somewhat thickened, and the trabeculae thickened. Microscopically, hyperplasia is found, and the organ is seen to be gorged with blood. Black pigment is sometimes seen but is frequently absent. By deep chromatin staining the parasites may be seen, usually in enormous numbers lying in mononuclear cells of various sizes. These infected cells are as a rule somewhat irregularly distributed throughout the splenic pulp, some areas being much more intensely infected than others, while the Malpighian corpuscles are usually free from infected cells.

In the liver, although enlargement is less constant and less, in proportion to its normal size, than in the case of the spleen, there is usually a decided histologic change. The appearance on section varies, being rather dark brown or showing a mottled brownish or yellowish appearance. A "nutmeg" liver is not uncommon. Microscopically, the intralobular capillaries are usually dilated and the infected cells, described above, are seen here in large numbers, either free or partially attached to the walls of the vessels. In most instances these infected cells are more common in the portal than in the hepatic zone of the lobules. A moderate degree

of cirrhosis is sometimes seen, but the principal changes are seen in the hepatic cells, which often show signs of atrophy and nuclear degeneration, while in some Leishman has seen advanced fatty change; but the parasites have never been seen in the hepatic cells. Black and yellow pigment may be found, but neither form is invariably present.

The bone-marrow is usually intensely infected with the parasites, which here also occur in mononuclear cells of the same nature as those in the spleen and liver. The yellow marrow is usually converted into red marrow, and is softer and more diffluent than usual. Histologic change is not marked in the other organs, in which the parasites are found only in small numbers, but here also they occur in the cytoplasm of cells similar to those described. The parasites have also been found in ulcers of the skin and of the intestine. Intestinal ulceration is not uncommon in kala-azar. In some cases the ulcers may be due to dysentery, in others they appear to be an integral part of the disease. The colon and sigmoid flexure are the most frequent sites of these ulcers and a great variety of appearances has been described in different cases, varying from small patechiae showing no superficial erosion, to large ulcers extending over a considerable area of the gut. Cicatrices of old ulceration are common, and both thinning and thickening of the gut have been found.

Because of the uncertain etiology of the older ulcers in some of the cases, it is not at present possible to define the typical features of the specific ulceration of kala-azar. When the parasites are found in these ulcers they are usually, intracellular and not very numerous. In a few cases also the parasites have been found in small papules and ulcers of the skin, and also in a lymphatic gland draining the area of skin affected by one of these ulcers. Their presence in cutaneous ulcers is by no means common, and many have searched for them in vain.

When seen in smears of spleen juice and stained by Romanowsky's method, the parasites are oat-shaped, oval and circular bodies, with a spherical nucleus lying close against the capsule and a short, rod-like body on the opposite side. Two of these bodies may be closely applied to each other and groups of them, from ten to fifty may be arranged in a rosette.

As regards ponos, according to Davidson, writing in 1907 and basing his observations on two autopsies performed by Cornil and Thromopouloz, the condition of the spleen tallies with that found in the majority of cases of infantile splenic anemia. The viscera in the case examined by Cornil showed no evidence of leukemia, tuberculosis or malaria. The spleen was enlarged and firm, the capsule dense, the trabeculae thickened. There was no notable pigmentation, nor any abnormal accumulation of leucocytes. The abdominal lymphatic glands were generally normal, but a few were somewhat enlarged. There was commencing cirrhosis of the liver. The kidneys were congested. There were signs of chronic congestion and inflammation of the right lung, with necrosis of the first rib. The bronchial glands were normal or slightly enlarged.

As regards the blood picture, Davidson states that if a type of splenic anemia exists in infants attended with leucopenia, it would be clinically indistinguishable from ponos. However, we now recognize such a type, Type I of Giffin, with a blood picture identical with that found in splenic anemia of adults.

*Malarial Splenomegalia*: Our knowledge of the pathology of the malarial spleen has been gained at operation for the persistently enlarged organ occurring in the chronic form, and at autopsy in the fatal pernicious form.

The first source of information rarely reveals the presence of parasites in the spleen and the diagnosis has been largely made on the history of the case and the characteristic pigmentation that occurs. The spleen is often very large.

In the acute cases the spleen is only moderately enlarged, 13 or 14 x 8 cm. as reported in Osler's cases, usually very soft in fresh infections and almost diffluent as studied by Barker. It may be lake-colored. It is usually darkly cyanotic due to pigment, and in old cases may be almost black. The enlargement may be so great as to result in rupture, either spontaneous or after slight injuries. The pulp is crowded with red blood corpuscles containing parasites which are usually in the later stages of development—bodies with central pigment clumps or blocks and segmenting bodies. Younger form are relatively uncommon. There are great numbers of phagocytes. usually mononuclear elements, some of which are about the size of the mononuclear leucocyte of the blood, some macrophages laden with pigment, parasites, infected or degenerated red blood corpuscles, and sometimes, smaller phagocytes. Focal necroses of the pulp are not uncommon. Chronic or frequently repeated infections result in more or less characteristic changes in the spleen which may become greatly enlarged. On section, the surface is somewhat slate colored, the trabeculae are very prominent, the reticulum, vascular sheaths, and septa are thickened, while single or multiple lymphatic cysts may arise. The gradual evolution of these changes has been minutely described by Bignami. Amyloid change has been observed after long and chronic infections.

*Syphilitic Splenomegalia*: Diffuse, non-gummatous enlargement of the spleen is quite frequently seen in patients with syphilis. In adults it is more often associated with gummas of the liver or a definite cirrhosis.

Gummas of the spleen may be miliary or solitary. Gummatous cicatrices cause a greatly enlarged spleen, and amyloid spleen has been found in chronic cases. Moxon has reported a case of acute splenitis associated with a very rare condition of syphilitic pneumonia.

Gummas of the spleen are very rare in children and extremely rare in infants. They are usually associated with gummas elsewhere. Still collected 4 cases from the literature and reported 2 cases of his own. In adults, gummas of the spleen are also rare. Still, in 1897, was able to collect only 21 cases from the literature. Martin reported a case

with marked anemia in which two or three small gummas were found in the spleen in association with multiple gummas throughout the liver. It is probable, however, that careful examination of the pathologic tissue would show a somewhat greater frequency for gummas of the spleen in adults than appears from a study of the literature.

The fact is striking that in adults as well as in children syphilitic splenomegalia is most frequently of a diffuse, non-gummatous character. It is well known that syphilitic splenomegalia may persist or recur in spite of the most active antisyphilitic treatment.

In syphilitic spleens the weight may vary from 670 to 900 grams. The contour may also vary according to the lesions. It may be normal or long and slender; the external surface may show nodules and perisplenitis, or be smooth. The notch may or may not be obliterated. On section the gland may be pale or dark, firm or tough. Histologically, there is a moderate diffuse fibrosis.

Two of Osler's three cases of syphilis with the picture of the so-called Banti type of splenic anemia were autopsied. One, a boy of eleven years, had been under observation for four years before death. A greatly enlarged spleen and a scarred cirrhotic liver containing several small gummas were found. The patient had had hematemesis and presented nodes on the skin, a syphilitic arthritis and ascites. The Wassermann reaction was negative. The second case was that of a woman of twenty-two years. A scarred liver, ascites and a severe anemia were present. There was no history of acquired syphilis and the case was seen before the days of the Wassermann test. The blood in Osler's first case in the boy above mentioned was stated at one time to be "practically normal" but three months before his death his red blood cells were 5,770,000, and leucocytes 4,640 per cu. mm., hemoglobin 65%. He died with hematemesis and ascites. The red cells fell below 2,000,000. Such a case in the periods following hematemesis certainly closely resembles the picture of splenic anemia. Attention is drawn here to the high erythrocyte count which preceded the bleeding. A red blood count of 5,000,000 and over, in a case of splenomegalia is very uncommon in any stage of splenic anemia, whereas in syphilitic splenomegalia it is so frequent, apart from the anemia of hematemesis, that its occurrence should at once suggest the probability of syphilis.

Thursfield and Gow have examined the records of 9 cases of splenomegalia at St. Bartholomew's Hospital, London, in which the diagnosis of syphilis was fairly established and in every instance the red blood count, again at periods remote from the anemia following hematemesis, was above 5,000,000. The hemoglobin averaged 75% to 80%. The same large number of erythrocytes has been observed in cases of massive tuberculosis of the spleen (Winternitz). This feature has been previously noticed in syphilis of the liver and spleen, but sufficient importance has not been attached to it as a diagnostic sign. Since, however, in such patients there is frequently a leucopenia, it is obvious that in the period of posthemorrhagic anemia the diagnosis from splenic anemia becomes exceedingly difficult. Both in syphilis and in splenic anemia a well-marked leucocytosis is common. Therefore, it is only during the posthemorrhagic periods that confusion should arise. Syphilitic cases often show no other manifestation of the diseases and the Wassermann reaction is not invariably trustworthy.

Enlargement of the spleen in early syphilis is quite common. Wile and Elliott, in a review of 100 cases of early syphilis, found 36 with palpable spleens. In none of these cases was there enlargement of the liver. Splenic enlargement in early syphilis usually tends to disappear, but may persist longer than any other visceral manifestations. Syphilitic splenomegalia during the first eighteen months of life, and especially during the first three months, is common. Between the ages of two to twelve years undoubted cases are relatively rare. Up to the age of six months splenic enlargement appears in 40% of syphilitic babies. Carpenter, in a review of 348 cases of splenomegaly in infants and children under twelve years of age, found 57 cases of undoubted syphilis with enlargement of the spleen.

*Tuberculous Splenomegalia*, in either the acute or the chronic form, is rare. Tuberculosis is probably very rarely primary in the spleen. The disease may attack this organ as it does other lymphatic structures and become localized. The original focus may be entirely healed. Winternitz reviewed the literature in 1912. He discussed 51 cases. The liver showed tuberculosis as well as the spleen in 80% of cases in which the organ was examined. Active pulmonary tuberculosis was detected in 24% of the cases. The disease was confined to the spleen in but one case and the liver and spleen together in but three cases.

G. W. Cottis has reported, under the title of splenic anemia a case of primary tuberculosis of the spleen in which he performed splenectomy.

A case of non-follicular tuberculosis of the spleen has been reported by Crouzon. The clinical diagnosis in this case had been chronic pulmonary tuberculosis. He found at autopsy in the parenchyma of the spleen a fibrous mass the size of a small orange. This mass did not appear to be tuberculous or to show caseous degeneration, but there were evidences of hemorrhage in the periphery. Upon microscopic examination, the growth was at first thought to be fibrous. There were numerous microscopic nodules, resembling structurally miliary tubercles which, however, were not caseous. It was not possible to find the Koch bacillus, but on the basis of the follicular grouping of the lesions, the intensity of the epithelioid transformation, the sclerotic interstitial process and the absence of any endarteritic reaction, a diagnosis of non-follicular tuberculosis of the spleen seemed justifiable.

Winternitz records polycythemia in 6 of 26 patients whose blood was examined. In 11 there was a varying degree of anemia. In 9 the blood was normal. Anemia with leucopenia was exceptional in his series. The red blood cell count in Cottis' case showed an elevation of 5,120,000, hemoglobin 45%, moderate leucopenia.

(*To be continued*)

# THE OBVIATION OF CHRONICITY IN CASES OF ACUTE POST-PNEUMONIC EMPYEMA.*

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Chronic empyema of the pleural cavity is not a necessary sequel to acute post-pneumonic empyema. It is safe to say that chronicity should very rarely, almost never, occur if the patient has received intelligent initial treatment and adequate after-care.

This paper will purposely be limited to a discussion of post-pneumonia empyema, caused by the commoner pyogenic organisms: pneumococcus, streptococcus, staphylococcus, etc. No attempt will be made to include tuberculous empyema, empyema following chest traumatism, or the undiscovered and undrained chronic empyemata that are occasionally encountered. The latter cases are chronic before ever operative treatment is instituted, and their chronicity is chargeable to the physician who failed to thoroughly examine his patient's chest—not to the surgeon who must relieve the distressing condition.

The usual causes of chronicity are: tuberculosis, faulty drainage, foreign bodies, osteomyelitis of the ribs, or pleuro-pulmonary communications. The consideration of tuberculosis and other necessarily chronic infections has been arbitrarily eliminated. Faults of drainage include both those due to the relation of the external drainage wound to the cavity as a whole, and also those due to the type or contour of the cavity within the chest. The position of the wound is under the control of the surgeon, the contour of the cavity is not. The wound may be situated too high to drain the lowermost part of the cavity, with resulting depending pocket. It may be very low, and connected with the cavity proper by an unduly long and narrow sinus. It may be transthoracic, as when a posterior pocket is drained through the anterior axilla or attempt is made to reach an interior pocket through the back. The cavity itself may be multilocular, or there may be diverticula from one large pocket. In any of these instances there are mechanical obstacles to the free evacuation of the exudate.

Foreign bodies include, not only lost drainage tubes—the most frequently encountered group—but also, in these post-pneumonic cases, sequestrated fragments of ribs. More will be said of this later.

Osteomyelitis of the ribs is of relatively infrequent occurrence, but its incidence may be affected by the type of operative procedure.

Pleuro-pulmonary communications are hardly within the control of the surgeon, but should be recognized whenever they exist. They may vary in size from extremely small openings, which may reasonably be expected to obliterate themselves, to bronchial fistulae several millimeters in diameter. They may be single or multiple.

Finally, there remains a group of chronic cases with large cavities, but free of any of the above mentioned causes of chronicity. In this group chronicity may be due to poor resisting power on the part of the patient, but more often it is due to unintelligent treatment during the acute stage. Too great a reliance on aspiration or the convenient, but dangerous, "closed" methods of drainage may doom many patients to unnecessary chronicity.

It therefore behooves the surgeon to be on his guard lest his patient suffer the misfortune of becoming a chronic case. I say "surgeon" advisedly, for I have a strong conviction that empyema is not a problem that can be adequately met by those who are not trained and equipped to think and act along surgical lines. He should approach his patient with a clear idea of the mechanics of respiration, and a sound knowledge of the different pathological reactions of the pleura to the several organisms by which it may be infected. He should base his plan of attack on an accurate bacteriological diagnosis, for there are fundamental clinical and pathological differences between the types of empyema occasioned by the commonly encountered organisms—pneumococcus and streptococcus. To quote from an earlier paper:

"Empyema of the streptococcus origin is, in the typical case, a sequel to lobar pneumonia, occurring after the crisis of the original disease. Compared to streptococcus empyema, the exudate is relatively small in amount, accumulates slowly, is walled off early, and rapidly becomes frankly purulent. Bilateral empyemas rarely occur. The patient, having recovered from pneumonia, can withstand operative intervention. The empyema cavity being walled off from the general pleural cavity, there is little or no possibility of collapse of the lung following open drainage.

"Empyema of the streptococcus origin is, in the typical case, a complication of a broncho-pneumonia, occuring during the acute phase of the disease. Compared to pneumococcus empyema, the exudate is large in amount, is rapidly poured out, filling the entire pleural cavity and preventing adhesions between lung and chest wall, is not walled off early, and does not become frankly purulent until after a lapse of seven to fifteen days. Bilateral empyemas, while not common, are more frequent. The patient, being still acutely sick, is in no condition for serious operative intervention. In the absence of protective

*Read at the Thirty-second Annual Session of the New York and New England Association of Railway Surgeons.

adhesions, early open operation is attended by grave danger of massive collapse of the lung and open pneumothorax."

Therefore, while the surgeon has much latitude of action in pneumococcus cases, he must proceed with greater caution in the streptococcus cases.

No opening should be made through the chest wall without first mapping out, as accurately as physical examination and roentgenography will permit, the boundaries of the cavity, and endeavoring to locate the drainage wound not only at the bottom of the cavity, but also at such a point that the freest possible drainage will be obtained with the patient in the positions which he can be ordinarily expected to assume—standing, sitting or lying on his back. Nor should the opening be made without first determining by aspirating needle that it is going to lead directly into the cavity.

The relative position of the opening through the chest wall and the incision in the skin will vary as the arm and shoulder girdle muscles are moved over the chest wall proper. If the operation be carried out with the patient's arm lying close to his side, there will be a more direct tract leading into the pleural cavity, than if the arm be raised high above his head, as is often done.

If the surgeon elects rib resection as his operative procedure, two technical points are to be considered. In the typical subperiosteal resection (which is undoubtedly the optimum way in which to carry out the operation) there are two potential sources of trouble. If the periosteal sheath is allowed to remain, there will be regeneration of bone. This will necessarily occur in an infected environment and there will be much chance for osteomyelitis. Whether or not osteomyelitis does occur, the drainage opening will eventually be reduced to a very small and narrow channel. The drainage tube will also press upon the intercostal nerve, with resulting pain. By excising the periosteal sheath, after the rib has been resected, these objectionable features can all be eliminated. It is true that excision of the periosteal sheath necessitates excision of the accompanying intercostal nerve, artery and vein. I have never seen any bad results from this procedure, and feel the actual advantages far outweigh the theoretical disadvantages.

The second point of technic deals with the treatment of the stumps of the ribs. In typical subperiosteal resection, both the anterior and posterior stumps are inevitably denuded of their periosteum for a distance of about a centimeter. Thereby unprotected and unnourished bone is allowed to lie in an infected field. Infection, necrosis and spontaneous sequestration occur in order. If the fragments come out through the external wound, well and good, but if they drop back into the cavity within the chest a foreign body is immediately introduced and a cause of chronicity established. It adds but a moment or two to the time of operation to cleanly bite off, by rongeur, all denuded bone and thereby eliminate such a possibility.

Whether a single stage operation be employed or multiple stage operation be adopted, will depend more on the individual problem presented by each patient, than on any general law that can be formulated to cover all such cases. However, it must be borne in mind that the longer definite action is postponed, the greater is the possibility of chronicity.

The initial approach to the problem is not the only time when the surgeon must be on his guard against the causes of chronicity. The period of after-care is beset by even more insidious dangers. The surgeon must be ready to give freely of his time and thought to the patient, for too often there is no continuity of dressing care or no established dressing procedure. Lost tubes result from just such conditions. Even apart from that empyemas—and all infected wounds for that matter—require more thought and careful attention than can be accorded by the youngest member of the house staff, the one to whom they are usually relegated.

It has been amply demonstrated that in the absence of bronchial fistulae, or other pleuro-pulmonary communications, an empyema cavity may safely be irrigated with any bland solution. The intelligent use of antiseptics will hasten the day when the cavity can be considered clinically sterile, and possible of closure.

The wise surgeon will also follow his case through to the very end and not permit discharge from hospital until the case is really cured, and the intrapleural condition known to be satisfactory.

Finally, let there be a plea to differentiate thoracic surgery from general surgery, just as, long ago, genito-urinary surgery, gynecology, orthopedic surgery, neuro-surgery have all been differentiated from the general field. There are peculiar problems to be met with in dealing with the thoracic viscera, and they will be met more successfully by those who have devoted the necessary thought and study to this subject.

Personally, I rely on the following factors: An accurate bacteriological diagnosis, a choice of operative procedure that seems to be best suited to the patient in question, daily personal attention to the dressings and other features of the after-care, frequent fluoroscopic examinations, and the retention of the patient under my own control until I know that he has been cured.

# TREATMENT OF THE CHRONIC STAGE OF EMPYEMA.*

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A patient comes to you with a chronic empyema, a closed thorax, with or without the expectoration of pus; what can you do with him? A chronic empyema is something unusual if it has become chronic without expectoration through the mouth and without drainage out into the world. Cases of this kind can be treated at first, provided they are near enough to the surface, by the ordinary methods of the acute empyema, but you will have to expect another operation, because after an empyema has became chronic, its walls have become rigid and the lung will not expand unless you do something to those walls, chemically or physically, to bring it to the surface. I have had no success by the chemical method. I believe Col. Keller of the Army has caused the lung to expand by the use of gentian violet in 2% alcoholic solution. The other way is to get at the membrane which is confining the lung and loosen it up surgically. Whether the empyema is closed or open makes no difference; sooner or later that will have to be done in a certain proportion of cases.

There is another way that I should have mentioned that is most important and that is the employment of the Carrel-Dakin method in which a chronic empyema can often be thoroughly and completely disinfected in such a way that the cavity can close, leaving an aseptic pneumothorax; and, strangely enough, sometimes even when there is a bronchial connection, a pleuro-bronchial fistula, this can be done. If it can be done, then for months or even longer, sometimes the lung may gradually spread until it again fills the thoracic cavity; and this may happen just as well in some cases by leaving the matter entirely to nature, without even using an antiseptic.

In chronic empyema with a thoracic fistula, with or without a bronchial fistula, what is the proper treatment?

In these cases there are only two things that can be done. One is to disinfect the cavity if possible, as I have said; we have used Dakin's solution for that purpose and have used the strictest Carrel method for employing it. The other is to operate. I am not going into the treatment by Dakin's solution because it would take a long time to describe the minute details, but I will say that unless you are prepared to go into these details and you yourself supervise at least one dressing every single day, don't blame the method if you don't succeed. It requires the loving personal care of the surgeon. You cannot succeed by leaving this daily routine to anybody else, although the in-between dressings may be left to a careful physician or surgeon, or even to a skillful nurse, or even to the care of a trained member of the patient's family, a layman. But unless you are prepared to go the whole length, you had better not try Dakin's solution treatment, except as a preparation for the operation by surgery.

We come, then, to the operative treatment of chronic empyema. First of all, can the lung be made to expand? You can make a guess at the prognosis in this respect by fluoroscopy. If the patient stands behind the screen and coughs and you can see that his lung has a tendency to expand, that case is a fairly hopeful one. If it doesn't move, the chances are not so good and the case may not be curable by any form of plastic surgery except collapsing the chest, which is the last resort and almost a confession of failure. But when you are looking at the patient with the fluoroscope be sure that what you see is not the pushing over of the lung and the mediastinum by the pressure in the healthy side.

Most of the chronic sinuses are in the place where thoracotomy for acute empyema is usually performed, perhaps in the eighth or the ninth interspace and usually just behind the posterior axillary line. Put in iodoformized vaseline about 20% and then have the patient examined roentgenologically; see if you can find out where the sinuses lead and how big the cavities are. The reason I prefer iodoform to bismuth is that if there are pockets into which the material can be forced and from which it is not easily extruded, and you use bismuth it may remain there long enough to cause toxic effects. It isn't strictly an antiseptic and it is not an absorbable substance. I have had two cases of bismuth poisoning. The iodoform-vaseline works perfectly, it will do the patient good instead of possible harm and will show in the *x*-ray picture just as well as the bismuth. It is not absorbed quickly enough to poison the patient, although you may find a little iodine in the urine when the substance is retained in residual pockets, but it is finally absorbed.

I believe that we ought to make the lung come to the surface whenever possible and not bring the chest wall to the lung. It may be possible to expand the lung completely. It may not be possible; in that case you have to do a little thoraco-plastic compression, but do no more than is actually necessary to obliterate the cavity. The first step is an incision in the 7th or 8th space, preferably above the fistula left by the preceding operation which is usually in the posterior part of one of these spaces.

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Occasionally it is necessary to make the incision below the fistula. This wound should be prolonged upward posteriorly parallel to the spine as far as seems necessary to give the requisite space. Then with a large Liston's bone forceps or a laminectomy forceps the two or three ribs above the intercostal part of the incision are divided by slowly bringing the blades of the forceps together at right angles to the plane of the ribs. In this way the intercostal structures are crushed and not actually cut, so bleeding is slight and may be absent. With a powerful rib-spreading retractor this wound may now be spread wide and exposure of the entire hemithorax secured. If an intercostal artery does bleed, cut the next rib above immediately and put in the rib spreader, and you will see exactly where the vessel is and can catch it. There is no need of making wild jabs at it with an artery clamp as soon as it begins to bleed because the chances are you won't be able to catch it and you will only lose time. It is not necessary to peel away the periosteum. Securing an injured intercostal artery is not difficult when the rib spreader is in place exposing the bleeding point. The pleura is entered at the time the ribs are cut by this method.

You will find the lung held down, often its surface grayish in color, perfectly smooth when lymph and granulations are wiped away; and here and there may be little spots of granulations into which you can stick a probe and perhaps find a residual cavity. The entire cavity should be exposed even though a number of ribs must be cut, but it is rarely if ever necessary to divide any higher than the third rib.

Make an incision with the knife through the pulmonic exudate from the top of the cavity straight down to the diaphragm. Instantly, if it is a favorable case, the lung will expand and you will know at once that the case is a favorable one. Then peel away the thick exudate from the visceral pleura with scissors or with the scalpel or even the fingers until you have the whole lung or as much of it as appears in the wound freed and expansile. Differential pressure is not necessary in these cases, but it is pleasant to use and the lung once delivered of its confining membrane can be distended by positive intrapharyngeal pressure. If this method of anesthesia is not being employed, however, the anesthesia should be discontinued until the patient reacts and strains so that it may be seen whether or not the lung expands to the chest wall. If complete expansion cannot be secured an inch or two removed from each divided rib and three or four inches from one of the ribs next to the first incision will make a great difference in the capacity of the thorax so that the lung can fill. The operation is then finished, except for drainage. Suture the wound, but before that ream out the old sinus. Be sure there is no dead rib left there. If there is, that has to be taken away too. If there is not, simply ream out by running a piece of gauze through and pulling it back and forth from within and without the chest. Put a large drainage tube through, so you can put a Carrel tube inside of it, and then suture the main wound in layers. That finishes the typical operation which I originally devised for the cure of these cases and called *major non-collapsing thorocoplasty*.

There is usually very little post-operative shock. There may be a little blowing of air from the surface of the lung. If there is not, so much the better. If there is, postpone using an antiseptic for a number of days, or until when the patient strains with the glottis closed and you can hear no whistle at the opening. But in ordinary cases you can begin on the second day using the Dakin's solution by the Carrel method, every three hours, day and night, and then making the bacterial counts. When you get two or three bacterial counts negative, or when they are not exactly negative but there are no streptococci present and only one or two other germs in the field, it is perfectly safe to take the tube out and let that chest close, which it will usually do promptly.

The blowing of bottles and arm exercises are important, so as to dilate the lung as much as possible.

If there is a pleuro-pulmonary fistula, then you cannot treat the case after the operation in the way that I have described and the prognosis for a healing without collapse is not nearly so good as when no such complication exists. I have never been able to find one of these bronchi and dissect it out and tie it off in an uninfected field and invert the lung over it as has so frequently been described. I begin to doubt whether anybody ever did this on a human being exactly as described; I think it is a dog operation. But I will say this: most of those pleuro-pulmonary fistulae will close spontaneously. I have even seen them close under much worse conditions than empyema, namely, following a lung resection. These bronchial fistulae need not alarm you unless they tend to pull the skin in, so that there is an epithelial lining from the skin to the mucosa; then you have to do another operation, the details of which I will not go into here, to loosen the bronchus from the thoracic wall and push it deep into the chest.

Chest collapsing operations for chronic empyema I shall not consider here. They are formidable and should be avoided if possible.

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**WALTER M. BRICKNER, B.S., M.D., F.A.C.S., *Editor***
**New York City**

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## THE SUCTION APPARATUS IN ABDOMINAL SURGERY.

The occurrence of suppurative lung infections as a direct consequence of operations upon the throat —most often tonsillectomy—has been so frequently reported and so well studied that the possibility of such an unfortunate complication is today fairly generally recognized and, to the same extent, the means to avoid it have been fairly standardized. Thus many throat surgeons remove tonsils in the adult only under local anesthesia and, we believe, all competent throat surgeons use a suction tip to keep the pharynx continuously dry when performing tonsillectomy under local anesthesia. In *all* operations upon the mouth and upper air passages conducted under general anesthesia it is of great importance to thus prevent the inspiration of blood; and in such operations even without narcosis, as the evacuation of a retropharyngeal abscess, a suction apparatus should be regarded as an essential part of the surgical equipment.

It does not seem to be quite so generally recognized that the use of a suction device may also be lifesaving in certain abdominal operations where the gravity of the condition makes speed a vital consideration, viz., in instances requiring the rapid removal of collections of pus or blood.

The prognosis in purulent peritonitis often depends largely, sometimes almost wholly, on the speed with which the operation is conducted. The indications are to deal with the source of the infection (ruptured appendix or pus tube, perforation of stomach or bowel) and to evacuate the accumulated pus. If the pus is removed by mopping and sponging the time thus consumed, which, in the nature of the procedure, must usually be added to that occupied in treating the primary lesion, may unduly prolong the operation and quite turn the tide against the patient. With a suction tip the pus can be removed rapidly and automatically, *while the perforation in the bowel or the gangrenous appendix is being attended to*—a saving of many precious minutes that may well mean the saving of a life! The same argument applies for the rapid evacuation of blood from the abdominal cavity, as in ectopic pregnancy.

If pus is not diffuse but is collected in the pelvis the aspirating method is not as important, but it is none the less superior to sponging, in that it is more thorough, more rapid, involves much less traumatism, and frees a nurse from the task of preparing "wipes."

Aspiration is performed through a suitable sterilizable metal tip, of the type devised by Kenyon and Pool, leading the fluid through sterile stout rubber tubing to a vacuum bottle sufficiently large to contain all the evacuated liquid without overflowing into the pump. The latter may be a small portable "vacuum cleaner" apparatus, or an otherwise driven air pump of sufficient force and volume, or a Sprengel air pump attachment to a water or steampipe. Kenyon and Pool described several years ago the employment of such a simple device on the Sprengel principle, using an "ejector" or a filter pump as an attachment to the water or steam-pipe or to the faucet, respectively. This device has several advantages: it is cheap; it is noiseless in operation; it is an inconspicuous, permanent attachment that can easily be installed in any operating room; it requires very little attention. It is necessary only that the force and the volume of the flowing water or steam are sufficient. A pressure of twenty pounds is necessary.

A suction apparatus affords a cleanly and convenient means of evacuating large collections of fluid in any part of the body. It should be part of the equipment of every operating room.

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Neither is the knowledge of anatomy alone the stock-in-trade of a surgeon. The great anatomist usually may not qualify as a surgeon, because he dissects instead of operating, while the great surgeon does not play the part of an anatomist, because it is necessary in his work to sacrifice much of the anatomy.—HUBERT A. ROYSTER in *Southern Medical Journal.*

# Progress in Surgery

**Selections from Recent Literature**

**Autotransfusion.** LUCIUS E. BURCH, Nashville, Tenn. *Surgery, Gynecology and Obstetrics*, June, 1923.

Autotransfusion is a safe procedure, but in a limited number of cases reactions will ocur. Sodium citrate is not essential. Normal salt solution will make an admirable substitute, and if neither of these is at hand, the pure blood may be re-injected. Extra-uterine pregnancy will offer the largest field of usefulness for this procedure, but in wounds of the spleen, liver, wounds of the lung producing a hemothorax, and in operations where a large amount of blood is unavoidably lost, it will not only save life, but will hasten post-operative recovery. Contaminated blood should not be thrown away, but should be given as a rectal drip. Autotransfusion may occasionally be used to advantage in certain obstetrical complications, such as placenta previa, rupture of the uterus, and Cesarean section.

**Idiopathic Nephralgia.** J. T. GERAGHTY and W. A. FRONTZ, Baltimore, Md. *Southern Medical Journal*, June, 1923.

Geraghty and Frontz call attention to a not uncommon condition characterized by pain in the region of the kidney, often of a severity which incapacitates the patient, to which they have given the name "idiopathic nephralgia" because there is no known pathological condition explanatory of the symptoms. The diagnosis should be made only after the most painstaking examination by modern methods and is arrived at by elimination. Where the symptoms are of sufficient severity to warrant surgical interference a thorough freeing of the kidney and upper ureter of all the surrounding tissue and replacement of the kidney in its former position has given gratifying results.

**Cardiac Disorders Accompanying Exophthalmic Goiter. Some Factors in Their Pathogenesis.** ERNST P. BOAS, New York. *The Journal of the A. M. A.*, June 9, 1923.

The current theories of the cause of cardiac disorders that accompany exophthalmic goiter are considered by Boas to be inadequate. Evidence is presented that two mechanical factors may play a part in overloading the heart in exophthalmic goiter, thus making it more susceptible to secondary noxious influences. 1. The tremendous dilatation of the arteries and veins of the thyroid short-circuits the blood flowing to the neck and increases the load on the heart in the same manner as to arteriovenous aneurysms. 2. The heightened oxygen consumption causes an increased minute-volume flow of the blood, which may be from 25 to 60 per cent greater than normal. The increased work thus thrown on the heart is the chief cause for cardiac dilatation, hypertrophy and insufficiency in exophthalmic goiter.

**Contributions to the Surgery of the Heart and Pericardium. II. Gunshot Injuries of the Heart.** (*Beiträge zur Chirurgie des Herzens und des Herzbeutels. II. Die Schusszverletzungen des Herzens.*) H. KLOSE, Frankfurt. *Archiv. für Klinische Chirurgie*, April 30, 1923.

The most important physiological factor in gunshot injuries of the heart is the "heart tamponage" produced by the sudden outpouring of blood into the pericardial sac, compressing the heart musculature, with a resultant fall in arterial and a rise in venous blood pressure, faulty arterial filling, gradual cessation of the heart action, and death. Anatomically it is important to note the protection afforded by the sternum and ribs, the relation to the internal mammary artery, and the position of the pleurae and lungs lying anterior to the heart. Clinically, although injuries of the heart may occasionally give very mild signs and symptoms, the usual impression is one of marked illness, and shock is the most prominent feature. Objectively, one may note an increasing area of cardiac dullness, distant heart sounds, (often replaced by a "mill wheel whirr",) and a weaker and faster pulse, frequently barely perceptible, dyspnea, cyanosis, precordial pain, and, finally, with a progressive increase in the severity of the symptoms, death through heart failure.

Rupture of the heart may occur without penetration by a missile, in which case, it is probably produced by a reflex stimulus. The majority of gunshot wounds of the heart are effected by a transpleural path, thereby causing occasional injury to lung as well as to pleura, with consequent hemoptysis, hemothorax, and pneumothorax. Here, fluoroscopy and pericardial and pleural puncture are of great aid in diagnosis.

Although such wounds of the heart may heal spontaneously in a small percentage of cases, it is advisable to treat them surgically at the earliest opportunity after the accident, approaching the heart either by following the course of the wound, cutting through the neighboring ribs at their attachment to the sternum, and inserting a rib spreader, or by making a skin-bone flap. Conservative expectant treatment should be reserved only for those old injuries in in which normal, or nearly normal, function has been reestablished. Hemorrhage from the heart may be controlled by drawing forth that organ, compressing it, and making digital pressure in the region of the wound. Only interrupted silk sutures should be employed for repairing the injured muscle, and, contrary to the usual opinion separate sutures are not necessary for approximating the severed endocardium. Pericardium and pleura are closed without drainage in order to avoid the otherwise inevitable infection.

Complications in the healing are wound infection, pericarditis, pleurisy, and embolism. There is a mortality of approximately one-third of the cases.

Gunshot wounds of the heart are quite rare. The left heart, due to its greater size and more exposed position, is more frequently the seat of injury, and the prognosis after operation is much better than in cases of the right heart.

**Empyema. An Analysis of 100 Cases in Relation to Treatment.** HOWARD L. BEYE, Iowa City, Iowa. *Minnesota Medicine*, June, 1923.

Too great stress cannot be laid upon the value of dependent drainage in the treatment of empyema. This is not without risk, however, and in these 100 cases an opening was made into the peritoneal cavity in four.

The time to drain an infected pleural cavity is of the utmost importance and depends upon the character of the exudate.

Drainage must be maintained over a sufficient length of time. Respiratory exercises during convalescence are of value.

All drainage material must be accounted for to make sure that it does not slip into a cavity and maintain infection.

Prolonged and adequate drainage of a cavity must be tried before a failure of cure is determined and plastic operation advised.

The decortication operation has failed in the few cases in which it was tried in this series. The collapsing operations are often terribly mutilating, and in the average case the patient is better off with a permanently draining cavity which may be kept clean by daily irrigation.

A bronchial fistula has an inherent tendency to close, if adequate drainage of the empyema cavity is provided.

**Subhepatic Abscess Secondary to Appendicitis.** PAUL W. ASCHNER, New York. *New York Medical Journal and Medical Record*, June 6, 1923.

While the diagnostic difficulties are considerable in patients recently operated upon for appendicitis, they are much greater when, because of the location of the appendix, a subhepatic abscess presents as the primary condition.

The inflammatory exudate may occasionally resolve. If suppuration supervenes the abscess my rarely drain itself by breaking into the bowel. As a rule surgical drainage is indicated, and the approach should be made through a loin incision which permits of adequate exposure of the organs and spaces under suspicion, without risk of soiling the general peritoneal cavity.

Subhepatic abscess occurs, as a rule, in patients who show more or less spreading peritonitis at the primary operation, and the prognosis would naturally vary with the extent of the peritonitis and the patient's ability to localize it. When the subhepatic fossa becomes infected from the right anterior subphrenic space the prognosis is dependent upon that of the subphrenic infection.

It is apparent from the position of the abscess that it is walled off by the liver and kidney from the vulnerable dia-

phragm and pleura, while the omentum and colon protect the general peritoneal cavity. A well localized suppurative focus such as this offers a good prognosis if it is recognized early and drained by the proper route.

Subhepatic abscess should be distinguished from subphrenic abscess. The best surgical approach is through the loin by an incision corresponding to the anterior part of the usual kidney incision.

**Some Observations on Duodenal Alimentation.** JULIUS FRIEDENWALD and PAUL FOREMAN WIEST, Baltimore. *New York Medical Journal and Medical Record,* June 6, 1923.

Duodenal alimentation is not as a rule exceedingly uncomfortable when the technic is properly carried out, and it enables us to maintain nutrition when food cannot be taken in sufficient amounts in the normal way.

It is especially useful in the treatment of gastric and duodenal ulcer of a severe type, with intense vomiting, nausea and recurrent hemorrhage and especially those forms which have resisted the usual methods of treatment. The stomach is spared all irritation while healing occurs and at the same time the requisite degree of nutrition is maintained.

Duodenal feeding is of great value in the treatment of atony associated with a maximum degree of prolapse of the stomach and intestine, in which on account of the anorexia, the patient is unable to take an adequate amount of food. This form of feeding is extremely helpful at times in overcoming nervous anorexia and sitophobia, which are often associated with much loss of flesh, strength and mental depression.

It is useful in relieving nervous vomiting and the vomiting of pregnancy, etc.

It is a valuable means of cure at times following surgical procedures on the stomach, when nausea, vomiting and discomfort have recurred.

**Non-carcinomatous Tumors of the Stomach.** (*Über Magengeschwülste nichtcarcinomatöser Natur.*) TH. HUNERMAN, Vienna. *Archiv. für Klinische Chirurgie,* April 30, 1923.

In the surgical service of Eiselsberg of Vienna, during a period of 20 years, there were observed 1125 tumors of the stomach, of which 11 were non-carcinomatous and included 7 lymphosarcomata, 3 myomata, and 1 benign mucous membrane polyp. Thus there was a 0.6% incidence of sarcoma, as compared with 0.5% in Lexer's and 1% in the Mayo Clinic observations.

Clinically, the myomata may give rise to any or all of the classical subjective and objective signs of gastric ulcer, and therefore a differential diagnosis has not been made without the aid of the fluoroscope, which demonstrates a round, smooth-edged filling defect without a contracted stomach and without a delay in emptying time. Treatment consists in removal of the tumor, preferably by means of gastric resection, in view of the fact that these tumors frequently become sarcomatous. Still, the prognosis is uniformly good.

The patient with the gastric polyp complained of pain after eating and tenderness in the epigastrium, vomiting, and sour eructations due to a tumor causing marked pyloric obstruction. A good result followed gastric resection.

The lymphosarcomata gave in practically every respect the same picture as carcinoma of the stomach, but failure of differentiation is considered of no great practical importance since the most radical possible resection should be made in either form of malignancy. Gastro-enterostomy or jejunostomy is merely a symptomatic treatment for the advanced cases in which there is obstruction. The prognosis of sarcoma of the stomach is good in cases in which a radically wide resection is made.

**Intermediate Cervical Repair Following Confinement.** TITIAN COFFEY, Los Angeles. *California State Journal of Medicine,* April, 1923.

Coffey advocates repair of the lacerated cervix 9 or 10 days postpartum. He asserts the following advantages of the operation:

1. This repair hastens and insures a normal involution of the uterus and has much to do with preventing a subsequent metritis and endometritis.

2. There is no loss of tissue such as occurs when we repair a greatly hypertrophied cervix filled with scar tissue.

3. It does away with the necessity of the patient returning to the hospital for future operative work, and certainly must lessen the danger of malignant disease at a later period in life.

4. The approximation and healing is perfect and the scar tissue so trivial that it does not interfere in any way with subsequent dilatation of the cervix at future pregnancies.

5. A general anesthetic is not needed; therefore, the patient is saved this risk.

6. This operation does not interfere with the patient being up and around, nor with her going home at the end of the fourteenth day following confinement.

Six weeks following operation the results are most gratifying, the cervix normal in size and color, no cervical discharge, perfect union by primary intention, and a pinhole os that looks in many cases, as if it were a nulliparous os, and it would be hard in some to tell a woman has ever borne a child.

The operation is done with local anesthesia. The simple technic is described.

**A Case of True Missed Labor.** (*Beobachtungen an einem Fall von echtem Missed Labour*). F. KOK. *Zentralblatt für Gynäkologie,* 1923, **47**, No. 3.

A six-para of 34 years at term had vague labor pains. Fetal movements ceased and the breasts became flabby. One and one-half months later spontaneous rupture of membranes and expulsion of foul liquor amnii occurred. Next day a much macerated nine-pound fetus was extracted by perforation and embryotomy.

**Uterine Displacements and Pregnancy.** BENJAMIN RUSH MCCLELLAN, Xenia, O. *American Journal of Obstetrics and Gynecology,* March. 1923.

Uterine malpositions are the cause of sterility in probably not over 10 per cent of cases. which is quite too large to be negligible. Long continued sterility or repeated abortions should lead one to suspect a displacement of the uterus. Malpositions act as a cause for sterility by (*a*) mechanically interfering with the progress of the spermatozoa into the uterine cavity, and (*b*) by contributing to the functional disability of the tubes and ovaries which when long continued, results in organic degeneration. especially in the ovaries.

In a very few well selected cases a well placed pessary plus wisely directed hygienic and therapeutic remedies should be given a fair trial. Operative intervention is indicated in all cases where this has failed, if there is no legitimate contraindication.

**Vesico-Vaginal Fistulae.** ALFRED BAKER SPALDING, San Francisco, Calif. *Western Medical Times,* April, 1923.

Vesico-vaginal fistula results sometimes from injudicious use of drains following vaginal operations, and is occasionally encountered after difficult deliveries.

Fistulae may be prevented and sometimes small openings closed by resort to continuous bladder drainage. Where granulations are present, sometimes the negative galvanic current will stimulate the fistula to close.

Where the bladder mucosa is united with the vaginal mucosa, operation gives the only hope for closure. The best operative results have been obtained by dissecting the bladder entirely free from the anterior vaginal wall and separating the bladder from the anterior wall of the uterus, closing the fistula with either continuous or interrupted catgut, dissecting the pelvic fascia from the mucosa of the anterior vaginal wall, and overlapping as in the operation recommended for the cure of cystocele.

**Complications in the Urinary Tract of Fractures of the Pelvis; Two Cases: Bursting of the Bladder; Rupture of the Membranous Urethra.** (*Complications urinaires des fractures du bassin; deux cas: éclatement de la vessie; rupture de l' urètre membraneux.*) P. GUIBAL, Béziers. *Journal d'Urologie,* April, 1923.

In seven cases of fractures of the pelvis observed in one year, complications in the urinary tract were found in only two instances, and, strange to say, in those cases of very slight fracture. In the other five cases there were extensive fractures, yet no involvement of the urinary tract.

Urinary complications following fracture of the pelvis

may be classified as intra- and extra-peritoneal rupture of the bladder and rupture of the membranous urethra. Intraperitoneal rupture is characterized by an empty bladder on catheterization and typical signs of peritonitis. It is repaired by way of median sprapubic laparotomy and an indwelling catheter is inserted.

In extraperitoneal rupture a small amount of bloody urine is obtained on catheterization, while bloody urine invades the space of Retzius, the iliac fossae, the labia majora or the scrotum, and dissets under the skin of the abdomen and of the thigh. Operative approach is made through a median suprapubic incision, the bladder is closed completely, and a permanent catheter inserted, or, if necessary for proper drainage, cystostomy may be performed without an accompanying indwelling catheter.

With rupture of the membranous urethra, the bladder is full, tender, and painful and reaches above the pubes; the patient desires and tries to urinate, but cannot, the perineum is free, the skin of the scrotum is dark-hued and slightly infiltrated. Rectal examination reveals a marked infiltration in the region of the prostate, and a catheter passes only as far as the region of the prostate and, on withdrawal, is smeared with blood but no urine. For relief and repair of this condition a suprapubic cystostomy is made just large enough to admit a No. 20 catheter, and after symptoms of shock have disappeared a transverse perineotomy enables one to direct a catheter through the entire urethra into the bladder, where it is allowed to remain for 3 or 4 weeks. Reconstruction of the membranous urethra takes place about this sound.

The author describes in detail his two cases.

**A Tendon Suture which Permits Motion.** FRANK H. LAHEY, Boston. *The Boston Medical and Surgical Journal*, May 31, 1923.

This suture, of linen or silk, consists in the introduction of a double figure-of-eight stitch, one figure-of-eight being in each end of the cut tendons. The result is an oblique grasp and pull on the fibers of the tendon by the stitch whenever active motion in the tendon is instituted. It is well also to introduce two or three approximation stitches directly at the cut ends of the tendon to insure accuracy of healing.

It is also well to introduce the figure-of-eight stitch in the cut ends of the tendon, not so that the ends of the tendons are just approximated, but so tightened that the cut ends are crowded against each other a little. With institution of active motion the figure-of-eight will then settle into the tendon, thus affording a little slack in the stitch which compensates for the crowding together of the cut ends of the tendons. The method is illustrated.

**The Ideal Bone-Graft as Determined by Experimental Investigations.** S. L. HAAS, San Francisco. *The Surgical Clinics of North America*, Vol. 3, No. 3, June, 1923.

If the graft is dead, then all the uniting callus must be formed by the host, but if the graft is alive then it may share in the process of union. It can be proved that a transplanted bone is capable of forming callus by placing a bone that has been broken in muscle. It will be found that the two fragments will unite in a manner similar to that of a fracture under ordinary conditions. That this property of forming callus is dependent upon live bone can be proved by placing a fractured dead bone in muscle; it will be found that there will be no attempt at repair or signs of activity at the site of fracture. That the live transplanted bone has not only the property of forming callus, but has definite invasive power can be shown by placing a live fragment of bone in contact with a dead piece of bone in muscle. It will be found under favorable conditions that there will be a union of the two fragments and that there will be live finger-like processes penetrating the dead bone. It is believed that these experimental findings firmly establish the independent power of regeneration inherent in transplanted bone. Definite signs of proliferation, both osteoid and cartilaginous have been found at the site of fracture in a transplanted bone that had been exposed to a freezing temperature for three days. When the endosteum was curetted there was but a slight hindrance to healing, when the periosteum was removed the disturbance was more marked, but when both periosteum and endosteum were removed there was always a failure of union and very slight evidence of activity about the fracture site. Therefore it was concluded that it is preferable to have the periosteum and endosteum intact when the maximum of osteogenesis is desired in a bone-graft.

**The Obliteration of Bone Cavities in Chronic Osteomyelitis by Free Fat Transplantation. A Preliminary Report, Clinical and Experimental.** GEORGE R. DUNN, Minneapolis. *Minneapolis Medicine*, June, 1923.

The clinical and experimental work which has been done on this subject does not warrant any definite conclusion. Preceded by thorough surgical treatment and relative sterilization with Dakin's solution, the transplantation of fat may be a procedure of practical value in the obliteration of bone cavities in chronic osteomyelitis. In the case reported, the result was very satisfactory.

**Fractures of the Forearm.** WALLACE H. COLE, St. Paul. *Minnesota Medicine*, June, 1923.

Cole emphasizes that:

Conservative treatment must always be used if possible in the treatment of forearm fractures; circular plaster of Paris dressings should never be used as a routine procedure in such fractures; the use of splints of the coaptation type with a right angular splint for the elbow is the conservative treatment of choice; operative treatment must use the simplest fixative method possible to obtain results, the use of metal plates or wire being absolutely contraindicated; early massage and physiotherapy will hasten recovery of function and accelerate bony union.

**The Rational Treatment of Fractures of the Upper End of the Humerus. Report of End-Results.** JAMES WARREN SEVER, Boston. *The Journal of the A. M. A.*, June 2, 1923.

These points are essential in the treatment of fractures of the upper end of the humerus:

1. Anatomic restoration of fragments is best obtained by abduction, outward rotation and elevation of the humerus.
2. Traction in this position is essential for from four or five days to two to three weeks.
3. A satisfactory ambulatory splint may be employed rather than bed treatment. (Sush a splint is described and illustrated.)
4. Better and more quickly obtained functional results may be secured by this method than by any other.
5. Operation, except in certain cases of fracture dislocations, is generally unnecessary to restore fractured surfaces.

**Arthritis of the Hip with Flattening and Fragmentation of the Head of the Femur.** (*Arthrites de la hanche avec tête fémoral.*) A. BROCA and R. MASSART. *Revue de Chirurgie*, No. 3, 1923.

A form of arthritis of the hip joint in young children is described which had been previously erroneously classified usually as tuberculous. The really distinctive feature, revealed by *x*-rays, is flattening, followed by fragmentation into a variable number of small portions, of the ossification center of the head of the femur, and later a reossification. Trauma plays no role in the etiology of the disease. It is neither syphilis nor tuberculosis, nor yet an inflammatory process, (cultures for bacteria have proved negative) though it may have been preceded by an attack of influenza or chickenpox. Clinically, at the onset, the condition may resemble a true arthritis, later there may be muscular atrophy, and occasionally varying degrees of ankylosis may remain, but almost always there is a benign course of the illness and a return to normal. Treatment consists of complete rest of the affected limb.

**Longitudinal Growth of Long Bones.** KELLOGG SPEED, Chicago. *Surgery, Gynecology and Obstetrics*, June, 1923.

Speed reports 3 cases where the lesion influencing the normal growth is of such a character that instead of being destructive and damaging to the epiphyseal cartilage plate so that growth ceases, a stimulation seems to takes place

resulting in too much growth. This excess growth as directed toward the long axis of the bone is shown by an overgrowth of visible lengthening of the limb involved. This lengthening may take place without simultaneous increase in the transverse diameter of the bone, without increase in the size of the limb except its length and, as a rule tends to lengthen only that portion of the limb involved in the process, leaving the remainder and the body as a whole uninfluenced as to normal size. The growth seems to lie clearly in the diaphysis, the osteoblasts becoming superactive, laying down too much bone.

Speed concludes: Overgrowth of long bones apparently may follow infections of those bones, the infections not necessarily involving the epiphyseal areas. Also it apparently may follow epiphyseal displacements of even slight degree. Every patient with osteomyelitic epiphyseal disturbance of long bones should receive an early diagnosis and thorough conventional treatment, and each patient should be warned that growth disturbances, either undergrowth or overgrowth may result. Use and weight bearing on the limb should be restored at the earliest possible moment.

**The Relation of Sciatica to the Sacro-Iliac Joint.** JOHN COWAN, Manchester, Eng. *The British Medical Journal*, March 3, 1923.

Reviewing forty successive cases of sciatica Cowan was struck by two facts: First, the great frequency with which sacro-iliac joint pain is found associated with the nerve pain; the joint pain is present in most cases of under six months' duration, but it tends to disappear, although the nerve pain persists. The second point is that pressure on the sacro-iliac joint, in nearly all cases, causes acute pain down the course of the nerve, which, with pressure on the joint, is much more severe than the pain caused by local pressure on the painful spots down the course of the nerve. Cowan believes that some morbid condition in or about the sacro-iliac joint (probably an arthritis or a periarthritis) is usually the cause of the pain in sciatica; and that the pain is usually neuralgic.

Considering the sacro-iliac joint as the seat of disturbance in cases of sciatica, Cowan applies treatment towards that part and not towards the course of the nerve. The results have been striking in most cases, and could not have been obtained if the joint had not been the cause of the pain.

In early cases, mainly when there is pain in the joint, radiant heat and massage to the joint is very effective. In older cases ionization with iodin ions and massage to the joint usually give relief. Anodal galvanism to the painful spots down the course of the nerve can be given conveniently with the ionization. In some cases it is necessary to break down adhesions in the joint; this can be done by Swedish remedial exercises and also by means of the movement which is adopted in nerve stretching.

Recently Cowan tried diathermy in all cases, and found that the results are better than with any other form of treatment, especially in old-standing cases.

# Book Reviews

**The Pathological Physiology of Surgical Diseases.** A Basis for Diagnosis and Treatment of Surgical Affections. By PROF. DR. FRANZ ROST, University of Heidelberg. Authorized Translation by STANLEY P. REIMAN, M.D., Chief of Pathological Department of the Lankenau Hospital and Assistant Professor of Experimental Pathology, University of Pennsylvania. With a foreword by JOHN B. DEAVER, M.D., LL.D., Sc.D., F.A.C.S. Octavo; 535 pages. Philadelphia: P. BLAKISTON'S SON & Co., 1923.

When the German edition of this book appeared about two years ago, our review called attention to its significant character and predicted that it would eventually hold its place in general medical literature comparable to that of Krehl's notable Pathological Physiology. In fact the book made such a profound impression upon us that we urged its translation into English upon various of our surgical colleagues. This American edition therefore comes as no surprise. It is not necessary again to make extensive comments upon this work; we repeat that it is a mine of information, and that it will serve admirably not only from a didactic point of view, but due to its wealth of bibliographic data and sound critique, also as a working manual for research workers and students. Moreover, we insist again, it is as important for internal medicine as for surgery.

The translation is well done, and the text is interspersed with valued comments by the translator.

**Mistakes and Accidents of Surgery.** By HAROLD BURROWS, C.B.E., M.B., B.S. (Lond.), F.R.C.S.; Assistant Surgeon at the Royal Portsmouth Hospital; etc. Octavo: 470 pages. New York: WILLIAM WOOD & Co., 1923.

No recent small surgical work that we have seen has aroused in us more pleasure and interest in the perusal than this book of Burrows'; and we know of none that can be read with more profit by the novitiate in surgery. Indeed, it is replete with practical observations and experience, some of which may be new even to the experienced surgeon. The title is fairly indicative of the contents. Burrows deals with many of the commoner surgical affections, and points out, by aphorism or by citation of actual experiences, the mistakes and accidents that may beset the surgeon in their diagnosis and in the technics of their operative treatment. No attempt is made to cover the entire range of surgery nor, of course, to list all the accidents and mistakes that may arise among the conditions discussed. Nevertheless, a surprising amount of practical information, of useful hints, is contained between its covers. It is a small mine, rich in nuggets of surgical caution.

"I am conscious", says the author in his preface, "that my enumeration of disasters and misadventures is of staccato effect . . ." It is this very staccato effect that carries home, with pointed force, the value of the author's well-worded lessons. Nor are they written in a carping or holier-than-thou spirit. Appreciating that the dangers and misadventures that beset the surgeon are many, often unforseeable, and lurking within the possibilities of every case and at the elbow of even the most experienced, Burrows has attempted to chart some of these dangers so that "he who runs may read", drawing his lessons from his own mistakes as critically as from the mistakes of others.

The final section is a chapter devoted to a general consideration of the sources of surgical errors. It is a semi-philosophic disquisition that well reflects the admirable spirit in which, and the helpful purpose with which, this excellent little work was written.

**A Text-Book of Therapeutics** including the Essentials of Pharmacology and Materia Medica. By A. A. STEVENS, A.M., M.D., Professor of Applied Therapeutics in the University of Pennsylvania, Philadelphia; Professor of Therapeutics and Clinical Medicine in the Woman's Medical College of Pennsylvania, Philadelphia; etc. *Sixth Edition.* Octavo; 793 pages. Philadelphia and London: W. B. SAUNDERS COMPANY, 1923.

The last preceding revision of Stevens' Therapeutics was in 1909. Since then much indeed has been added to medical therapy and to pharmacology and not a little that was formerly in use is now more or less obsolete. In this sixth edition the author has brought his work up to date by a general revision that is evident in numerous alterations and additions and also in the complete rewriting of many sections. We take from the preface the following list of preparations that Stevens describes in this edition for the first time: benzyl benzoate, papaverin, pituitary extract, thyroxin, thromboplastin, methyl alcohol, benzyl alcohol, mercurochrome, germanium dioxid, emetin, yeast, acid sodium phosphate, aluminum chlorid, phenobarbital ("luminal"), cinchophen ("atophan"), silver arsphenamin, acriflavin, proflavin, surgical solution of chlorinated soda, chloramins, scarlet red, quinidin, ethyl-hydrocuprein (optichin), surgical paraffin, carbon dioxid snow.

Following the logical system also prevailing in similar works this treatise is divided into two portions. The first consists in a description of drugs and other remedial agencies according to their physiological actions. The second part deals with applied therapeutics and is descriptive of the uses of medical agencies in various diseases.